

Thus, despite Katsnelson's interesting model for testing arsenic for carcinogenicity and his findings of a few unusual application-site gastric tumors, we remain unconvinced that the collective experimental findings on arsenic can be taken as proof that arsenic is carcinogenic to animals; by this we mean, on the singular basis of the available animal data (and, for the moment, ignoring the human data), that neither IARC nor the National Toxicology Program (NTP) would judge arsenic as a "probable" or "reasonably anticipated" human carcinogen. The available animal data alone simply do not meet the criteria for either IARC or the NTP to consider the laboratory evidence as being adequate and sufficient to list arsenic as a likely carcinogen to humans. Of course, both organizations do consider arsenic and arsenic compounds as being unequivocally carcinogenic to humans based on epidemiological data.

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## Independent Review of Industry-generated Data

The commentary of Gibson et al. (1) of Dow AgroSciences takes issue with our estimates of potential risks to children from indoor broadcast uses of chlorpyrifos (2) that were derived from a recent study by Gurunathan et al. (3) at the Environmental and Occupational Health Sciences Institute (EOHSI) of Rutgers University. Specifically, the Dow AgroSciences researchers claim that potential indoor exposures of chlorpyrifos are "approximately 10 times below" those found in the EOHSI study.

Unfortunately, there is no easy way to examine the claim made by Gibson et al. (1) because most of the pertinent data on which their statement is based are not available in the peer-reviewed, published literature. Thus, we are unable to determine whether the test protocols or exposure time periods used in the previous unpublished Dow studies are comparable to the experimental approaches used in the EOHSI study. For example, Gibson and colleagues' citation of biomonitoring data of volunteers (simulating childlike activities) following broadcast spraying of chlorpyrifos—demonstrating potential childhood exposures to be 10-fold below EOHSI estimates—is based entirely on one internal, unpublished Dow Chemical Company study (4). Similarly, Dow AgroSciences' exposure study after "crack and crevice" treatment by chlorpyrifos for insect infestation is based on an industry-sponsored study whose results were only recently published (5).

On the other hand, Gurunathan et al. (3) presented a detailed and well-conducted assessment of exposures to chlorpyrifos over a 2-week period following a one-time broadcast application of chlorpyrifos by a licensed pesticide applicator. Most published studies in the past that examined exposure levels related to broadcast spraying of chlorpyrifos did not measure the pesticide's indoor concentration beyond 1 or 2 days following applications [for example, see Fenske et al. (6)]. What the EOHSI study showed was that chlorpyrifos, like other semivolatile pesticides, did not dissipate or settle down, but continued to vaporize into the gas phase and resettle on a variety of solid surfaces indoors (such as children's toys) over an extended period of time.

Furthermore, the experimental protocols used in the EOHSI study (3) simulated conditions that may easily lead to an underestimation of exposure to indoor uses of chlorpyrifos. As we stated in our commentary (2), in a number of facilities where many children are present

... such as day care centers, schools, and homes, where chlorpyrifos-based products may be frequently sprayed on to control insect infestations, there can be cumulative exposures that are much higher than those currently estimated from the [EOHSI] and other pesticide exposure studies based on single [broadcast] applications.

This exchange raises two pressing issues for public policy. First, those in the public and private sectors charged with developing national guidelines and standards to protect children from environmental hazards often make decisions based on incomplete information. Secondly, we agree with Gibson et al. (1) that a weight-of-evidence approach is the best way to resolve issues involving the safety of widely used compounds such as chlorpyrifos.

However, a weight-of-evidence approach can only work if there is full disclosure of industry-generated unpublished studies. In order to obtain scientific consensus on such matters, we propose that technical reviews of unpublished industry data be carried out by scientists and other technical experts working under the aegis of institutions such as the National Academy of Sciences, the Health Effects Institute, or other similar independent organizations. We would welcome the creation of such institutional arrangements to make it possible for exposure and health risk assessments to be conducted on a complete scientific knowledge base.

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### EMF Working Group

A brief note on the results of the NIEHS EMF working group was given in the September issue of *EHP* [106:A431 (1998)]. It may be helpful if more details of the NIEHS EMF working group deliberations are provided.

The NIEHS EMF working group members voted according to guidelines used in the International Agency for Research on Cancer (IARC) *Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans*. No members voted to classify EMFs as either a known or probable human carcinogen (IARC groups 1 and 2A), 19 members voted to classify EMFs as a possible human carcinogen

(IARC group 2B), 8 voted to classify EMFs as not a human carcinogen (IARC group 3), and 1 voted to classify EMFs as probably not a human carcinogen (IARC group 4).

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### "Politically Correct" Research

It is unfortunate that the National Institutes of Health have become so politicized. I do not understand how the original study of Swan et al. [Have Sperm Densities Declined? A Reanalysis of Global Trend Data. *EHP* 105:1228-1232 (1997)] got such widespread attention; one would expect the arguably most important government organ concerned with the study of health issues in the United States to have a higher standard than that exemplified in its dissemination of its original study.

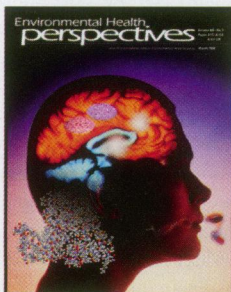
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